

PUBLIC ACCESS AND WILDLIFE COMPATIBILITY SURVEY

Results



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Prepared as part of the Public Access and Wildlife Compatibility Policy Development Project

SAN FRANCISCO BAY
CONSERVATION AND
DEVELOPMENT COMMISSION

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Chapter 1

Introduction

Background

The San Francisco Bay Conservation and Development Commission (BCDC) is charged with both protecting the Bay and its wildlife resources, and providing for maximum feasible public access to and along the Bay. Federal and state resource agencies and nonprofit environmental groups, such as local chapters of the National Audubon Society, the Sierra Club and Save San Francisco Bay Association, have sometimes objected to the public access provisions of projects approved by BCDC, contending that public access is incompatible with wildlife. Moreover, federal and state resource agencies, such as the U.S. Fish and Wildlife Service and the California Department of Fish and Game, also periodically object to the public access provisions required by BCDC as a condition of obtaining a BCDC permit. Often the groups conflict in their independent view of whether public access is appropriate at a particular site and the appropriate scale and intensity of the access.

Over the last 30 or so years, BCDC's policies on public access have evolved from the fundamental goal of public access creation and expansion, to more complex policies that recognize the necessity of balancing development of public access with parallel goals of wildlife and habitat protection and enhancement. BCDC's permitting process has reflected the increasing attempt to balance public access opportunities with wildlife needs. However, in the years since BCDC most recently updated its public access policies, available information on the effects of public access on wildlife has increased and concern over this issue has grown. BCDC is now endeavoring to further revise its policies to better address the complex issue of public access and wildlife compatibility.

The San Francisco Bay Public Access and Wildlife Compatibility Project

BCDC received funding from the National Oceanic and Atmospheric Administration, Office of Ocean and Coastal Resources Management, to address this fundamental coastal management issue. BCDC has initiated, in partnership with the Association of Bay Area Government's Bay Trail Project (Bay Trail Project), the San Francisco Bay Public Access and Wildlife Compatibility Policy Development Project. This two-year study will generate improved information on public access impacts on wildlife and ways to address these impacts to facilitate better informed policy decisions.

Formation of the Policy Advisory Committee

BCDC formed a Policy Advisory Committee (PAC) to function as a forum for public input and debate and to help facilitate a consensus among regional public agencies and non-profit organizations on the development of revisions to existing public access policies. The PAC is comprised of fourteen individuals representing a wide range of professional fields, geographic areas and public interests to assist BCDC in developing achievable, effective consensus-based policies that may be implemented throughout the region. The represented disciplines include biologists (consultant, academic and agency), resource managers, regional park district employees, environmental planners, landscape architects, and non-governmental agency activists (including both recreation and wildlife protection advocates).

Distribution of National Survey

With assistance from the PAC, BCDC conducted a survey of land managers from coastal and Great Lake states nationwide. The goals of the survey are to gather further observational information on recreational impacts on wildlife, and to document on-site experiences with specific design and management strategies and how those strategies have or have not been an effective tool in avoiding or reducing impact on wildlife from human activities. Results from the survey will be incorporated with other information on human impacts on wildlife and design and management tools to avoid or minimize impacts. The cumulative analysis of all available information will be presented in a BCDC staff background report, which will include preliminary findings and recommended policies that will be presented for Commission consideration.

Chapter 2

Methodology

The Public Access and Wildlife Compatibility Survey was developed over several months by BCDC staff and the Policy Advisory Committee. Additional survey development assistance was provided by statisticians from the California Department of Fish and Game and the social science department of the National Park Service. The survey was pretested with representatives from local, state, and federal sites.

The survey was mailed to 362 land managers from coastal and Great Lake states around the country. The selected participants manage local, state and federal reserves, parks, refuges, open spaces, recreation areas, and wildlife management areas. The sites managed by survey participants contain sensitive habitat areas, such as wetlands or sandy beach, and allow public access for recreational activities.

Significant interest in this topic nationwide and a vigorous follow up effort resulted in 164 surveys returned, for an excellent response rate of 45 percent. However, seven of those surveys were returned too late for inclusion in the analysis. This report is therefore an analysis of 157 surveys.

Responses to the survey were tabulated, where possible. Many of the survey questions were open-ended and generated a variety of qualitative responses. Responses to open-ended questions were reviewed, categorized, and summarized to the greatest extent possible. Answers have not been correlated or queried for causal relationships. Not all respondents answered all questions.

Chapter 3

Survey Results

Background

Survey respondents provided background information on themselves and the sites they managed. A total of 157 surveys were returned from coastal and Great Lake states (Table A). The returned surveys represent a wide national distribution, with 62 responses from the Eastern Seaboard, 27 from Gulf Coast States, 61 from West Coast states, and 8 from the Great Lakes.

Table A. Breakdown of Survey Responses by State

STATE	# Sent	# Received	STATE	# Sent	# Received
Alabama	6	4	Mississippi	6	3
Alaska	18	9	New Hampshire	2	0
Arkansas	5	3	New Jersey	2	1
California	42	23	New York	2	0
Delaware	9	1	North Carolina	11	6
Florida	46	18	Ohio	1	0
Georgia	7	5	Oregon	29	10
Hawaii	4	0	Puerto Rico	2	1
Louisiana	11	6	Rhode Island	0	0
Maine	17	8	South Carolina	8	2
Maryland	25	19	Texas	6	1
Massachusetts	20	7	Virginia	13	4
Michigan	1	1	Washington	55	18
Minnesota	11	5	Wisconsin	2	2

The returned surveys also represent a wide distribution among various types of federal, state and local managed areas (Table B).

Table B. Breakdown of Respondents by Site Type

FEDERAL			
National Wildlife Refuge	National Estuarine Research Reserve	National Seashore (NPS)	Wetland Management District (USFWS)
60	10	5	2
STATE			
Park	Recreation Area	Wildlife Management Area	Preserve/Reserve
47	5	4	5
Natural Resource Management Area	Wildlife Park	Wildlife Sanctuary	
1	1	3	
REGIONAL			
Park	Preserve	Marine Reserve (park)	
6	2	1	
COUNTY			
Park	Wetlands Sanctuary (park)	Marine Reserve (park)	
2	1	1	
CITY			
Refuge			
1			

The majority of the respondents answering for the sites were the Managers, Assistant Managers, Directors, or Supervisors of the site. Figures 1 and 2 show the respondents' titles and the respondents' training/background, if provided.

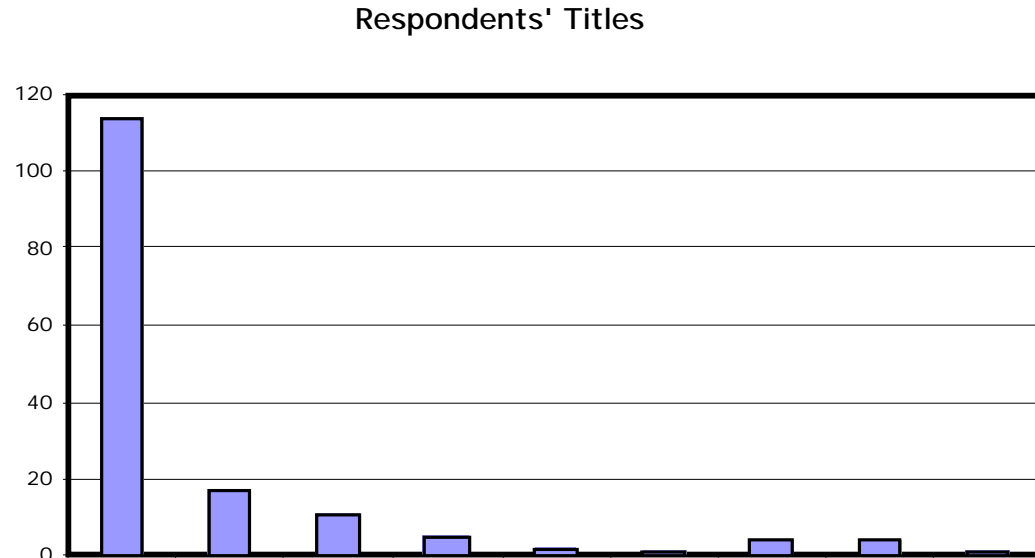


Figure 1. Titles of Respondents



Figure 2. Background/Training of Respondents

Figure 3 shows the varying lengths of time the sites have been open to the public, and Figure 4 shows the varying lengths of time the respondents' have been involved with the sites they provided information for. Most sites had been open at least ten years and most respondents had been associated with the site for five or more years.

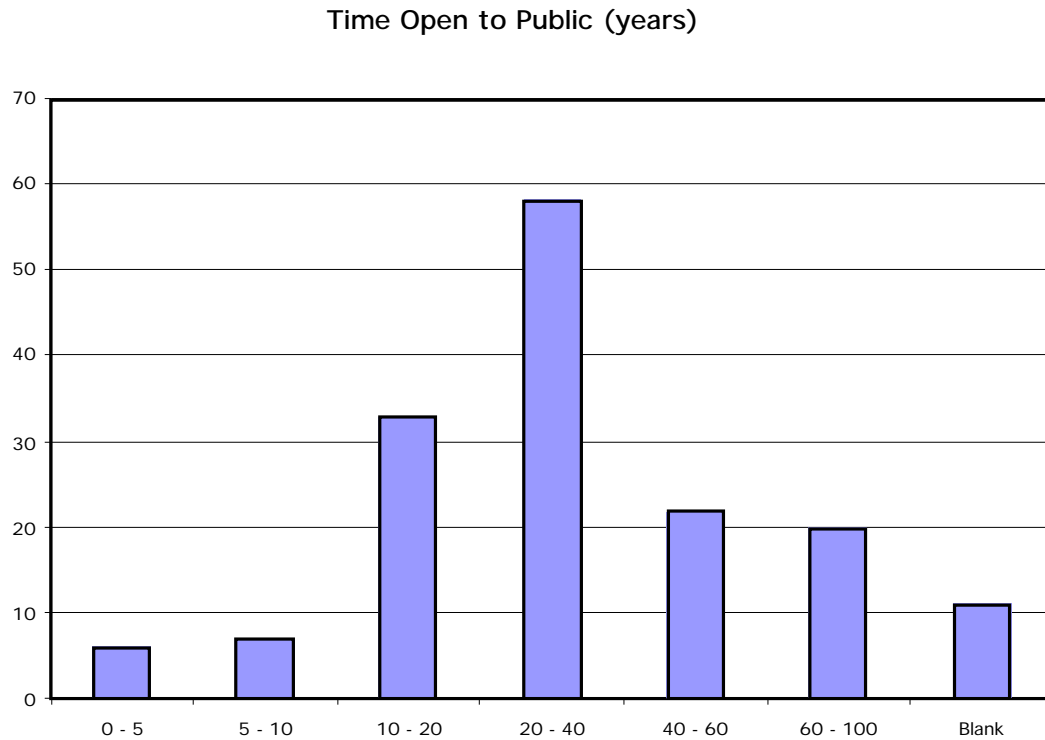


Figure 3. Length of Time Responding Sites Open to Public (in years)

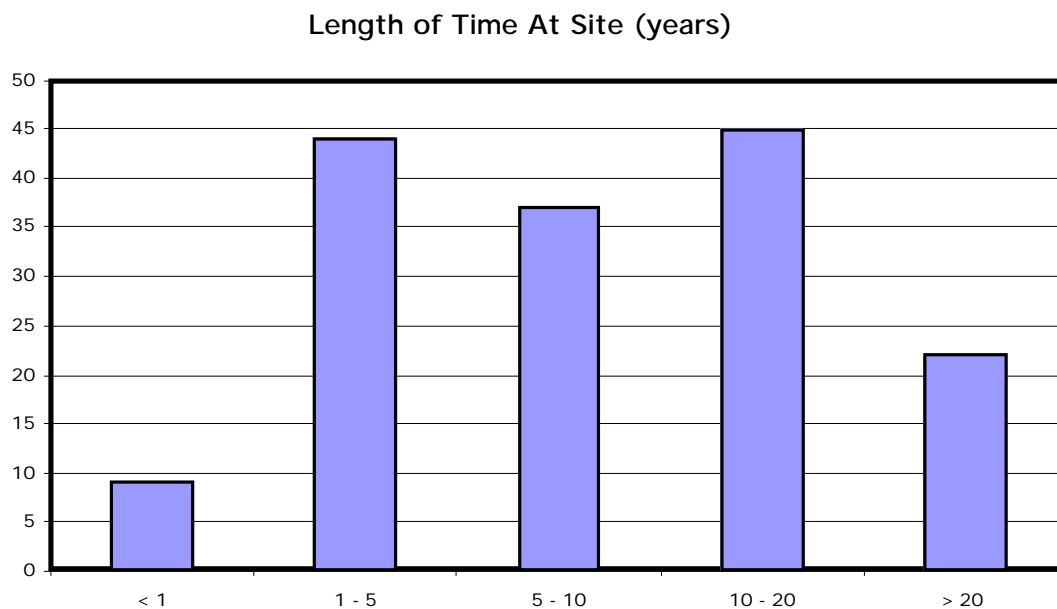


Figure 4. Length of Time Respondents' Involved with Site (in years)

Site Characterization

Respondents were asked a series of background questions regarding the sites they were providing information for. The responding sites were of various sizes as shown in Figure 5, with 33% of the sites 1000 acres or less in size.

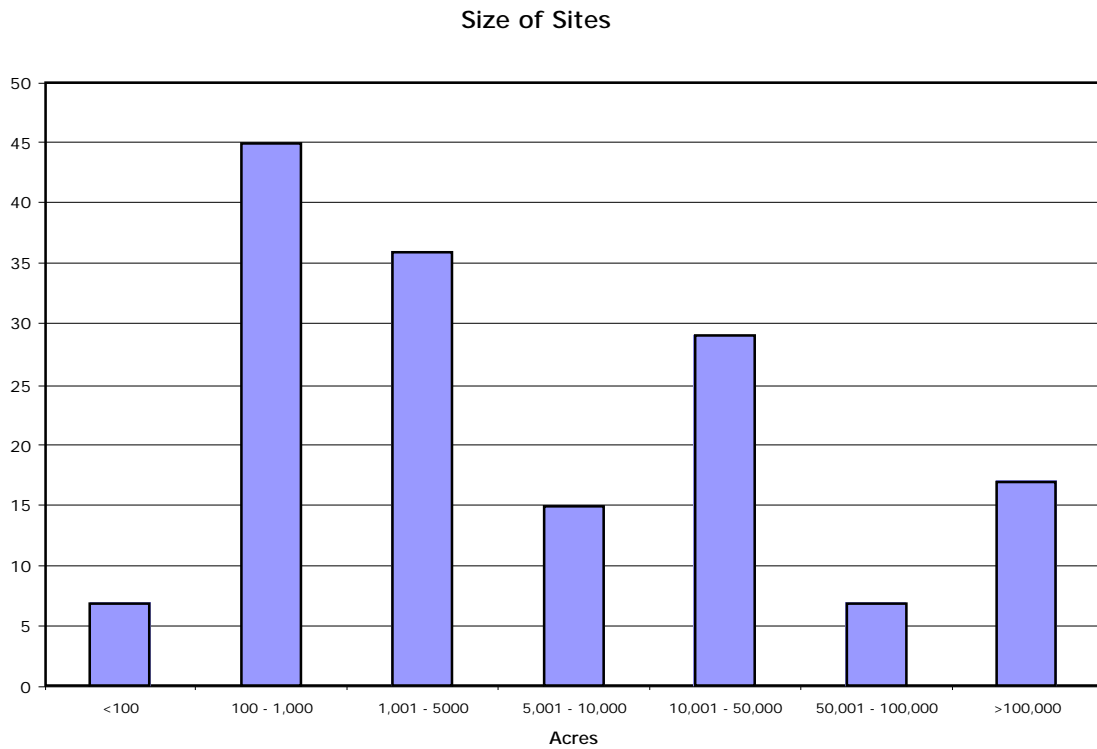


Figure 5. Size of Responding Sites

The sites contained a variety of habitat types, as shown in Figure 6. Types of land uses identified under “other” included agriculture (the most commonly identified other habitat type) tundra, glaciers, levees, agriculture, beach, rocky shore, coastal scrub, oak scrub, rock outcrop, pasture, mangroves, peat bog, and willow shrub.

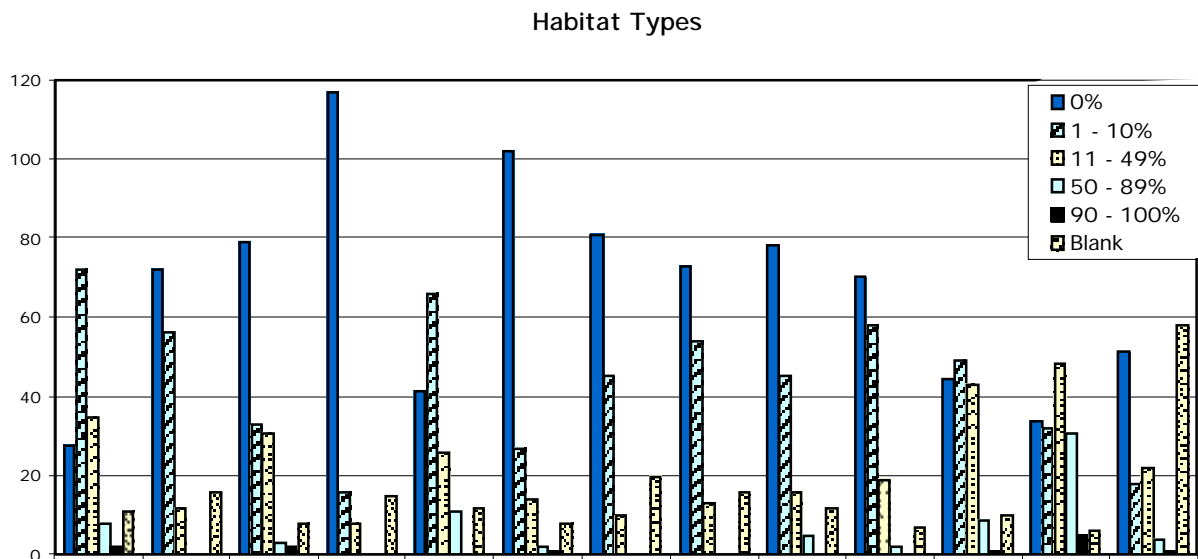


Figure 6. Percentage of Habitat Types at Responding Sites

Respondents were asked to indicate, to the best of their ability, the types of wildlife present at their sites (Figure 7a and 7b).

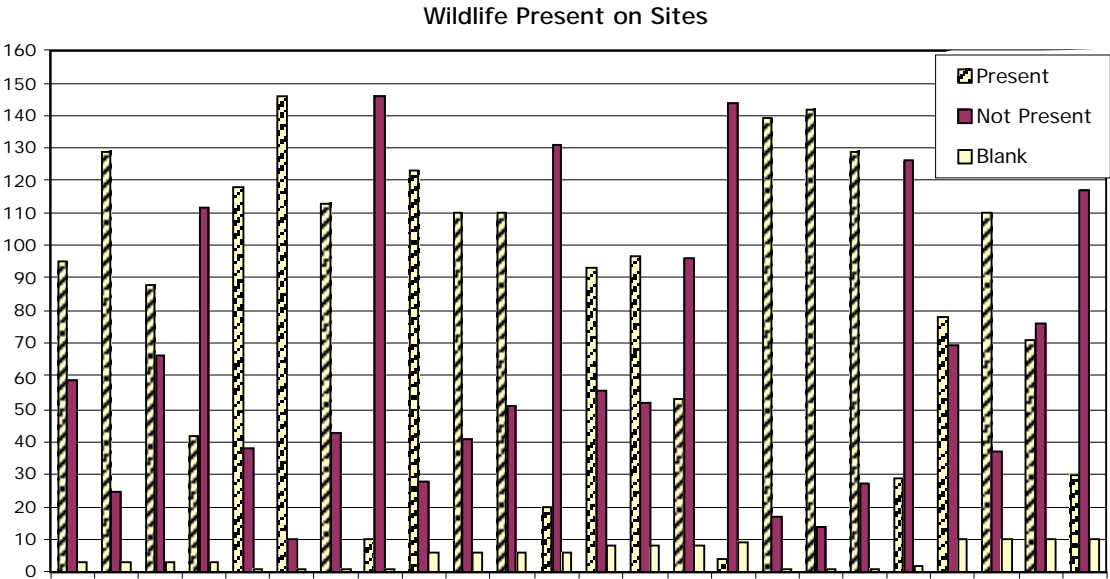


Figure 7a. Types of Wildlife at Responding Sites

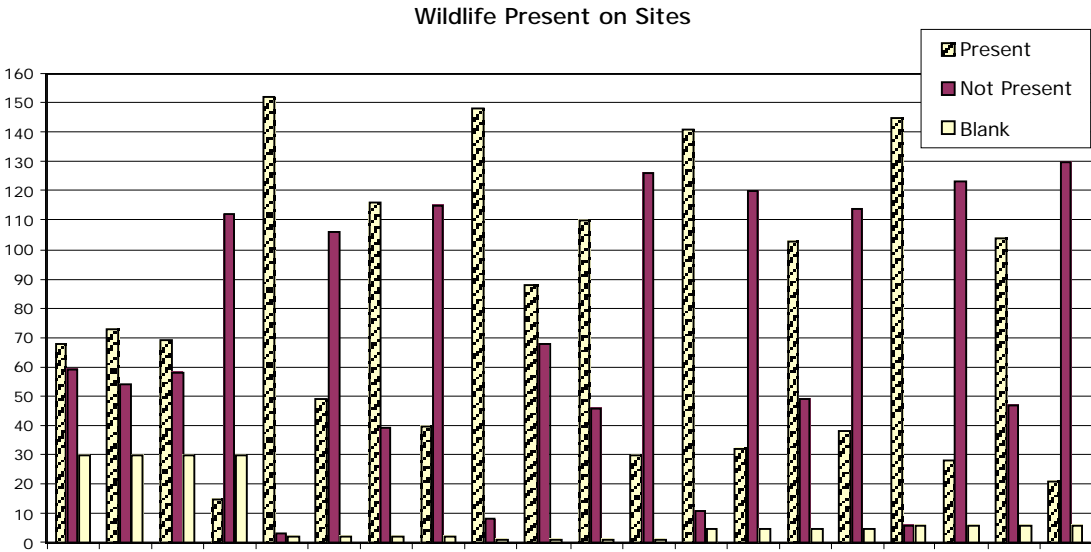


Figure 7b. Types of Wildlife at Responding Sites, Cont.

Respondents were then asked to identify the most common wildlife type(s) at their sites (Figure 8). The most common wildlife type identified were waterfowl, followed by passerines, then mammals.

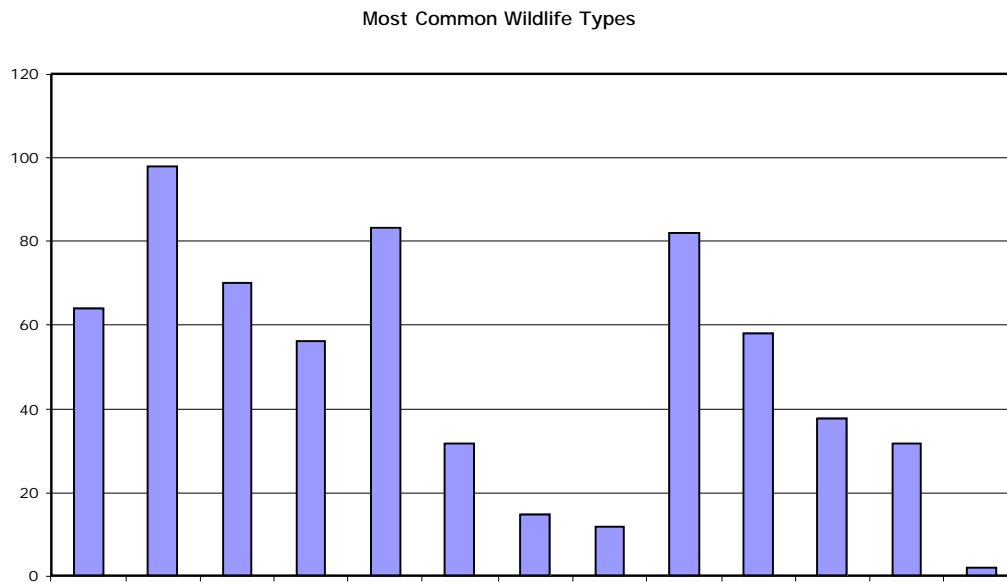


Figure 8. Most Common Wildlife Types Identified at Responding Sites

The responding sites also contained various amounts of trails open to the public, as shown in Figure 9, with the majority of sites containing between 1 and 10 miles of trails open to the public.

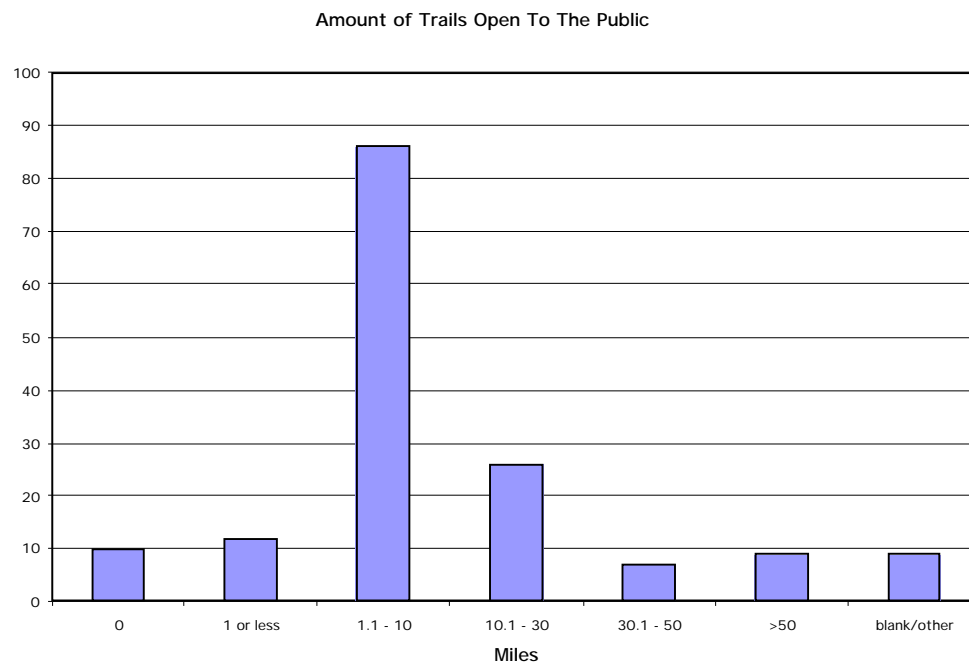


Figure 9. Amount of Trails Open to Public at Responding Sites

Finally, the responding sites had various types of adjacent land uses as shown in Figure 10. The most common types of adjacent land uses were open space, residential rural, and agricultural. Types of adjacent land uses identified under “other” included mining, timber harvest, hunt clubs, native villages, golf course, roads, open water, dump site/landfill, silviculture, government/military, oil/gas, and residential suburban.

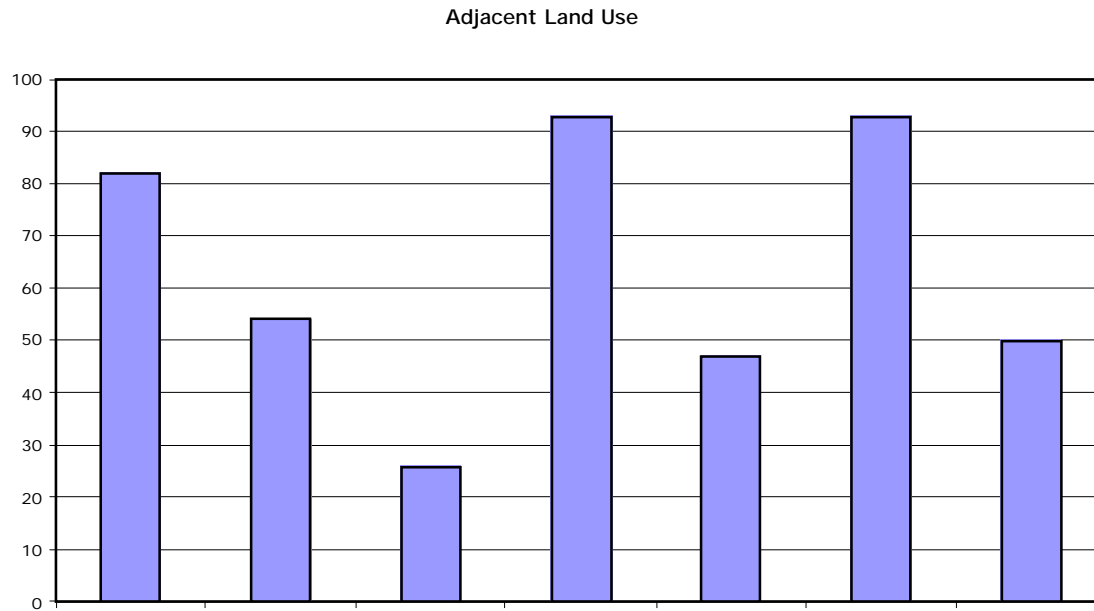


Figure 10. Types of Land Use Adjacent to Responding Sites

Human Interaction with Wildlife

Respondents were asked a series of questions regarding human interaction with wildlife at their sites.

The number of visitors at the sites ranged from 100 to five million (Figure 11). Most of the sites had a high degree of visitor use, between 100,000 and 1 million visitors in the last calendar year.

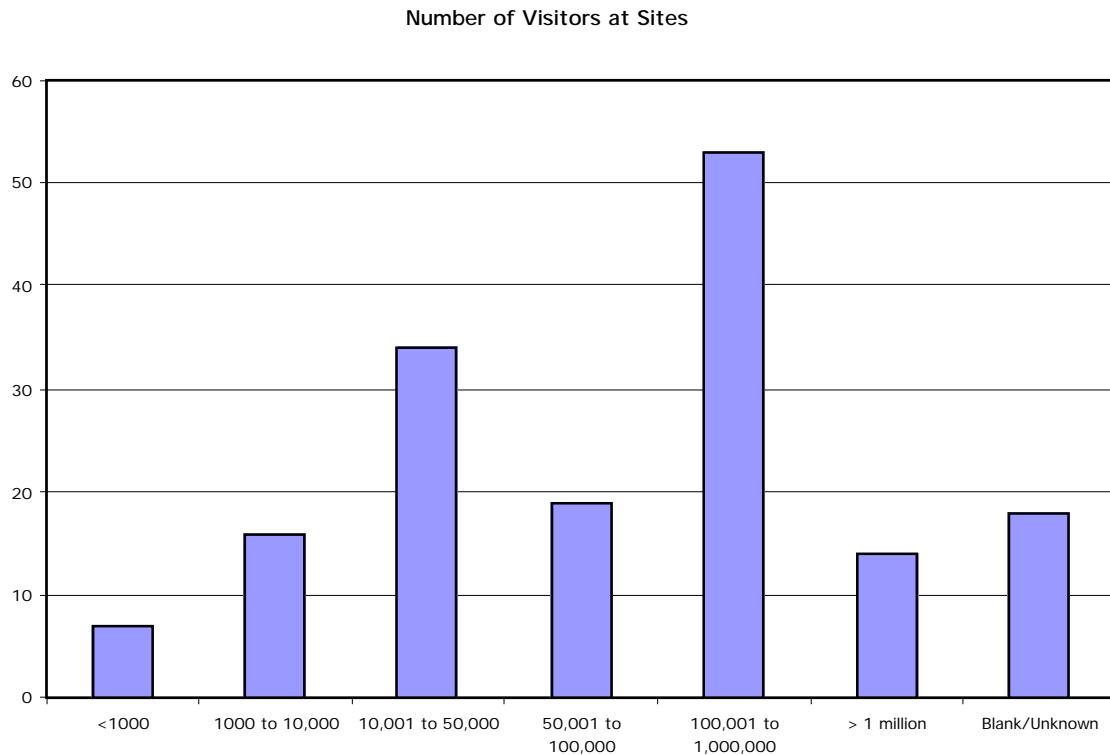


Figure 11. Number of Visitors to Responding Sites During Last Calendar Year

Respondents were asked how, if at all, they monitor impacts on wildlife from recreational activities at their sites (Figure 12). The vast majority of the respondents indicated they had informal, anecdotal, or observational monitoring and/or some degree of formal monitoring or surveys at their site (often species specific). The blank/other category includes answers that were unclear as well as blank answers.

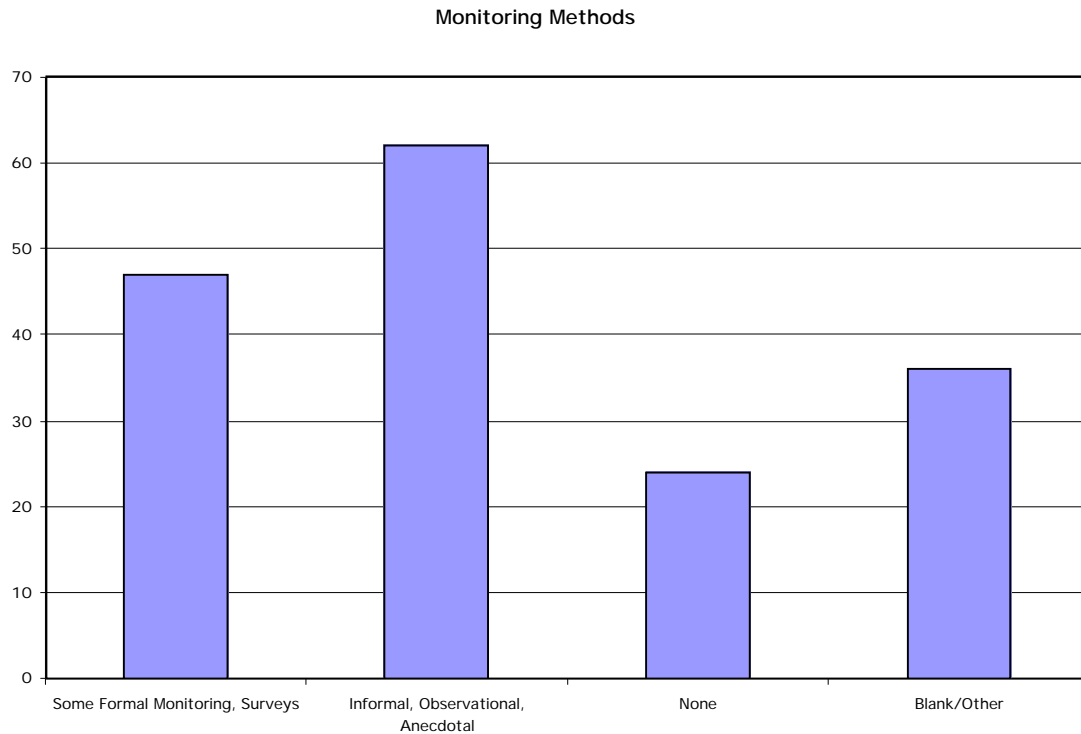


Figure 12. Methods of Monitoring Impacts on Wildlife From Recreational Activities on Responding Sites

Respondents were asked to identify all observed or documented effects on wildlife by activity type. Respondents were asked to identify both immediate effects (such as alarm calling, nest abandonment, flushing, reduced feeding due to increased vigilance, site abandonment, or fatality) and long-term effects (such as decreased reproductive success, site abandonment, decreased population within species, or decreased number of total species). Respondents were not asked to specify whether observed or documented effects were positive or negative. Figures 13a and 13b show results for those activities present (“activity not present” or blank answers are not included in results).

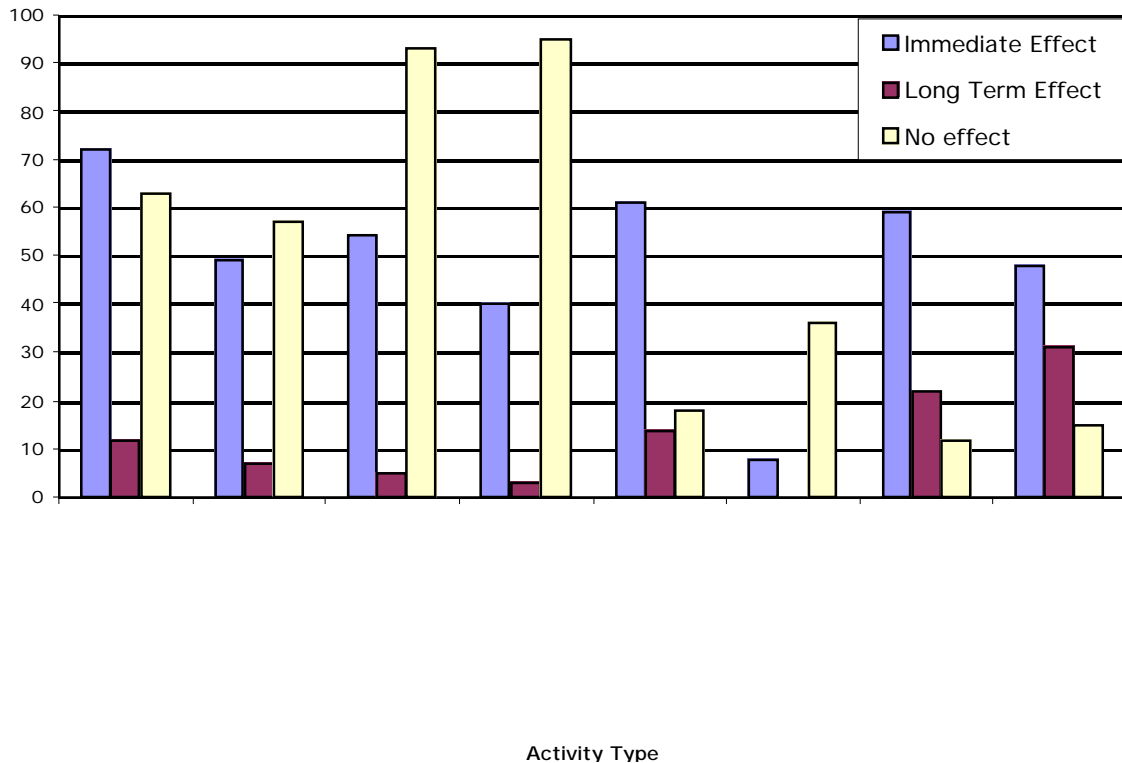


Figure 13a. Reported Observed or Documented Effects on Wildlife at Respondents' Sites

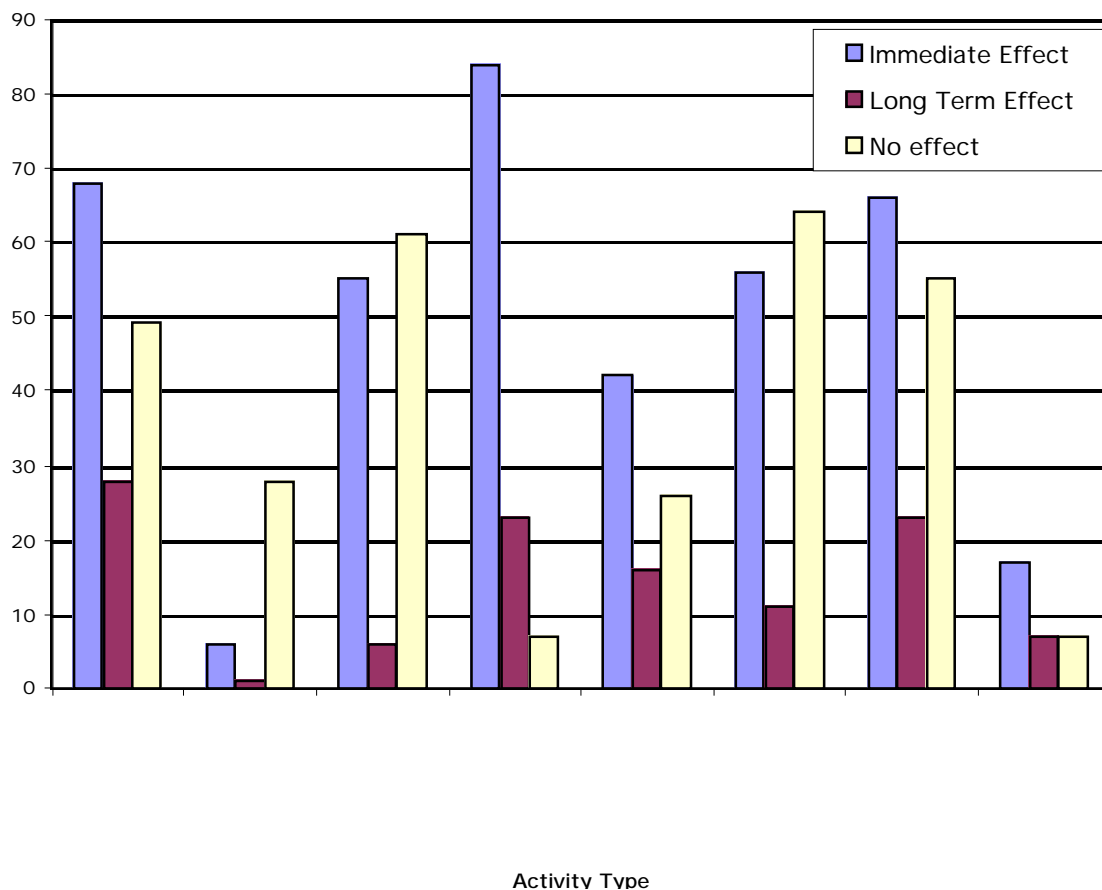


Figure 13b. Reported Observed or Documented Effects on Wildlife at Respondents' Sites, Cont.

It is important to note that respondents were not asked to correlate observed or documented effects on their sites with any other factors such as intensity of human use or management and design strategies employed at the sites. For example, seven respondents specified very low visitation at their sites (1000 or less visitors in the last calendar year) which may have affected their answers about observed or documented effects (i.e., no effect due to low intensity of human use). Similarly, the perceived effectiveness of various management strategies may have also affected responses regarding observed or documented effects of human activities (i.e., effects may have been avoided or minimized due to specific design and/or management strategies).

Finally, respondents were asked to provide any additional information that may help understand the effects of human activities on wildlife at their site. As expected, responses to this open-ended question varied, with 89 respondents answering. Many respondents mentioned specific conflict areas on their sites (i.e., Bear/people interactions, poaching, foot traffic on dunes, effects of light on sea turtles, vehicle/wildlife conflicts, photography, illegal uses, etc.).

Two respondents stated that effects were species specific. Three respondents indicated generally that shorebirds are easily disturbed by human activities, and one respondent cited observed movement of shorebirds away from trails. One respondent stated they had observed birds temporarily flushing at the site from every activity. Two respondents indicated location, seasonal modifications, and/or environmental factors as important modifiers of degree of impact

of recreational use. Two respondents indicated wildlife habituation as a reason for low/no impact at their site. One respondent observed that pedestrian traffic appeared to cause more disturbance to wildlife than vehicular traffic and one respondent observed no apparent conflicts between resting bald eagles and park visitors.

Many respondents discussed degree of use on their site. Fifteen respondents mentioned low human use of their site. Nine respondents mentioned use restrictions or discussed how access is controlled or limited at the site to limit impact. Two respondents felt that a high concentration of people negatively impacted wildlife at their site. One respondent stated it would be “misleading” to claim that any human activity has no effect. Four respondents discussed educational programs at their site. One respondent specified no observed impacts with multiple users on site. One respondent felt that activities on site resulted in a mostly “incidental” disturbance to wildlife.

Design And Management Strategies

Respondents were asked a series of questions regarding siting, design and management strategies on their sites. All of the respondents employed one or more strategy(ies). Figure 14 shows the number of respondents who employed each type of design and management strategy. The vast majority of all respondents felt that their design and management strategies were at least somewhat effective in avoiding or reducing impacts on wildlife from human activities.

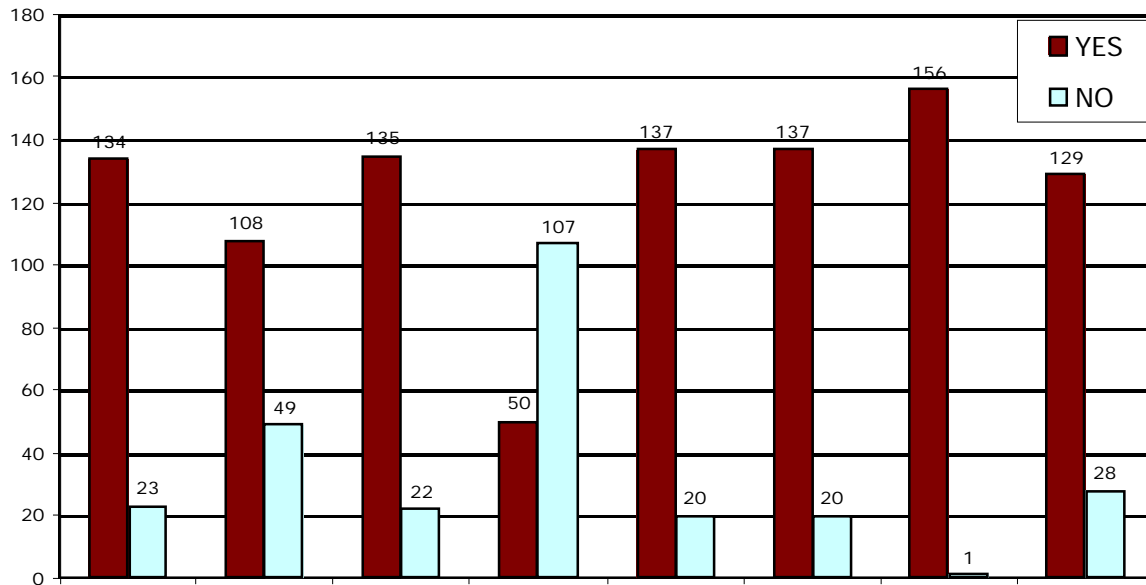


Figure 14. Design and Management Strategies Employed at Responding Sites

The following sections describe responses to design and management questions in more detail.

1. Trail Siting and Buffer Design

Trail Types and Separation Features. Respondents were asked to identify what trail types and features are present on their sites and of those trail types and features, which they felt are effective at avoiding or reducing recreational impacts on wildlife and why.

Loop trails were the most common trail type present at the sites (Figure 15), and vegetative buffers were the most common separation feature at the sites (Figure 16).

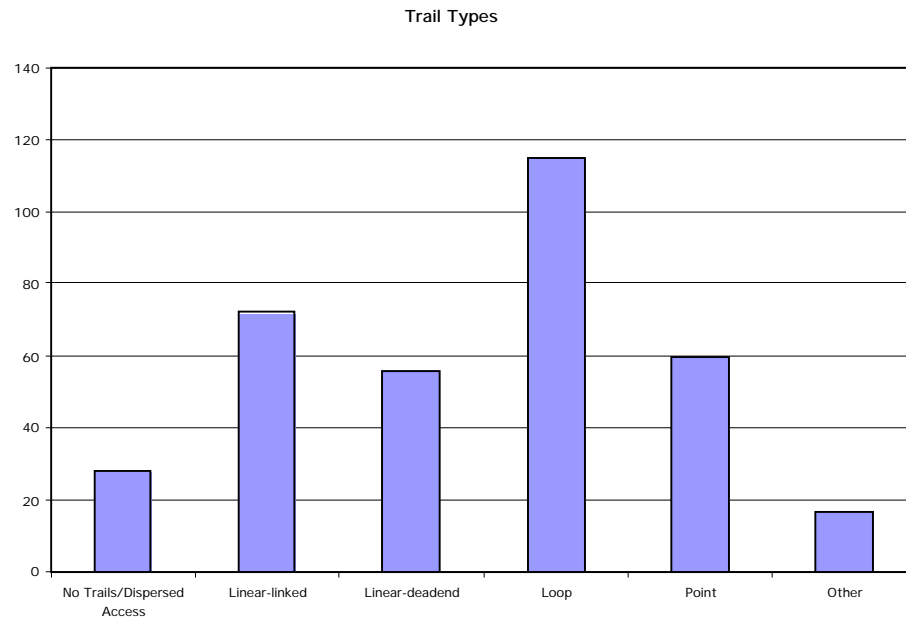


Figure 15. Types of Trails Present at Responding Sites

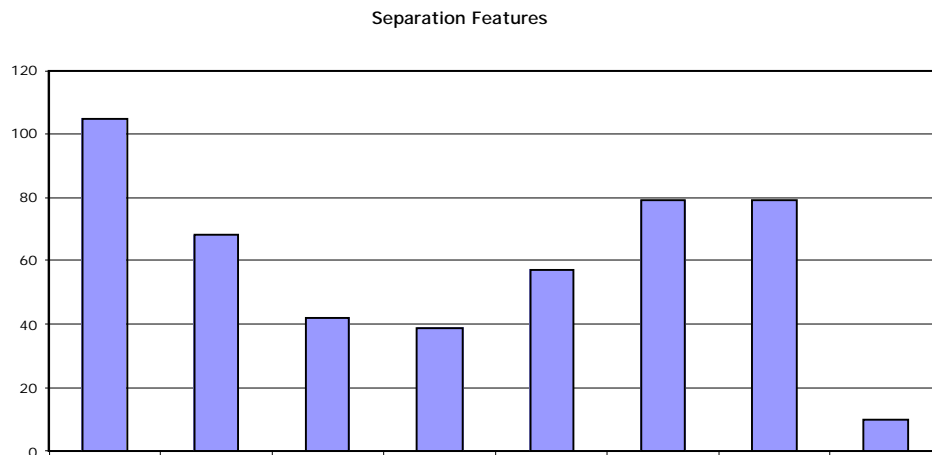


Figure 16. Types of Separation Features at Responding Sites

Vegetative buffers were the feature most often cited by respondents as effective at avoiding or reducing recreational impacts (43)(though it should be noted that vegetative buffers were also the most commonly present feature as shown in Figure 15). Reasons commonly cited for effectiveness included the benefits of vegetation for wildlife shelter and habitat (7), for visual screening (8), and for noise reduction (4). Vegetative buffers that discourage access (i.e., with thorns, etc.) were indicated several times as being particularly effective. One respondent also mentioned the erosion control benefits of vegetative buffers, and one respondent cited the “naturalness” of using a vegetative buffer as a benefit. The cost-effectiveness of vegetative buffers was also cited as a benefit (as compared to other features). Potential problems cited by respondents with vegetative buffers include that they don’t always keep out dogs and that they may not allow for desired visual access.

After vegetative buffers, both bridges/boardwalks and viewing platforms/overlooks were the features most often cited as being effective (30 each). Bridges/boardwalks and viewing platforms/overlooks were also tied as the second most commonly present feature at the sites. By far the most common benefit cited for both bridges/boardwalks, and viewing platforms/overlooks was that the features restrict/confine/structure access. Both features were also cited as providing predictability of human use for wildlife, and in preventing the creation of alternative “social” or “renegade” trails (guard rails on boardwalks were specifically mentioned). Viewing platforms were cited as effective due to the ability to view wildlife at a distance (thus avoiding contact), and by providing an interesting destination for public (increased visitor satisfaction). Boardwalks were cited as being particularly good for protection of certain types of habitat (wetlands, sand dunes, salt flats) and species (i.e., protection of seabird nesting burrows). A problem cited for both viewing platforms and boardwalks was cost (for both construction and maintenance).

Fencing was the third most cited effective feature, followed by open space buffers. Fencing was cited as effective at preventing access into sensitive areas by both people and dogs. Fencing allows some visual access while preventing physical access, and can protect restored areas (i.e., allowing vegetation to grow). Fencing was also cited by one respondent as the preferred method to protect bluff slope habitat from public access impacts. Potential problems cited with fencing were unattractiveness and cost. A commonly indicated benefit of open space was potential large distance between public and wildlife, which creates room for wildlife to see and react to public (may allow for wildlife avoidance of public, or wildlife escape routes).

Moats, sloughs, and levees were cited as most effective about five times each. The cited benefits of moats, sloughs, and levees include the creation of physical separations (often unpassable) and distance and the confinement/restriction of public access.

In terms of trail types, perimeter/loop trails were most often cited as the most effective trail type (loop trails were also cited as the most common type of trail present). Cited benefits of loop trails included reduction of traffic (public passes only once, generally one direction), looped trails provide a focused use that helps prevent renegade trails, and they require only one trailhead/parking area. Linear dead end trails were cited as potentially encouraging renegade trails as public are enticed to wander past the end of the trail. There were several comments on the benefits of trails in general including providing the “path of least resistance” for public which

prevents renegade trails and helps provide for public safety/confines public use. Another benefit of trails and separation features in general that was cited several times was predictability. Paved trails were mentioned as having positive noise reduction values and limiting cuts in ground. Several respondents cited the benefits of having interesting destinations and routes in general.

Prohibition of Trail Development. 107 respondents indicated there are areas within their sites where trail development is prohibited. 42 sites do not have areas prohibited from trail development. Eight respondents did not answer the question.

The most common reason indicated by respondents for prohibiting trail development was for habitat/species protection (91). The 91 references to habitat/species protection included:

- 28 general references to habitat or species protection
- 20 specific references to wetlands/marshes/bogs
- 6 specific references to dunes
- 12 specific references to threatened/endangered species
- 5 specific references to waterfowl and 3 references to birds in general
- 10 specific references to nesting species/areas
- 2 specific references to breeding species (marine mammals and birds)
- 1 each specific reference to riparian habitat, monarch butterflies, mammals, shoreline protection, and agriculture protection

The second most common reason indicated for prohibiting trail development was due to designated wilderness area, research area, or site regulations (32). Eight respondents indicated protection of cultural/archeological/historic resources, and ten respondents indicated inhospitable terrain/safety. Five respondents indicated that trails were prohibited to provide a buffer for adjacent property or for privacy, two respondents indicated erosion control, and two respondents indicated deterrence of access in general as reasons for prohibiting trail development. Additional reasons indicated included money/staff (2), lack of space (2), to prohibit dumping, to protect hunting area, to prevent predator access, to prevent native species displacement, and lack of public demand.

Respondents were asked to explain if they felt prohibition of trail development has or has not been an effective management technique for avoiding or reducing the recreation impacts on wildlife at their sites.

The majority of respondents indicated prohibition of trail development has been an effective management technique (75). Four respondents mentioned that trail prohibition is effective, but only if alternative adequate trails are provided (one respondent said observation platforms are sufficient as alternatives to trails). Four respondents cited limiting of people as the reason for trail prohibition effectiveness. Two respondents indicated prevention of habitat destruction and disturbance. Two respondents indicated that the prohibited areas must be properly controlled and signed and one respondent cited the need for species specific prohibitions. Other reasons for effectiveness included distribution of people over a broader area and distribution of people to perimeter of the area.

Seven respondents felt that prohibition of trail development has not been an effective management technique for avoiding or reducing the recreation impacts on wildlife at their sites. Four respondents indicated the lack of public abiding by rules as the reason for ineffectiveness.

One respondent felt that forcing dispersed access had a negative effect, and one respondent indicated the resulting lack of visitor predictability resulting from prohibition of trail development.

Eight respondents did not know if prohibition of trail development has or has not been an effective management technique. Three respondents indicated the need for more science, before being able to judge effectiveness, and two respondents indicated the impacts to wildlife from trails were less than impacts from commercial and residential development.

Respondents were asked for any additional information that may help in understanding the trail siting and buffer design at their sites. Respondents' comments included several specific trail siting and design strategies at their site, such as trails built on levees, trails built on existing roads, the use of trial and error trail siting, species-specific needs resulting in trail design on a case-by-case basis, trails built for cost-effectiveness, recreational and educational goals as guides for trail development, respect for site as guide for trail development, and avoidance of wildlife contact as guide for trail development.

2. Public-Use Management and Stewardship

Area Closures. Respondents were asked to identify which types, if any, of area closures they employ at their site (Figure 17).

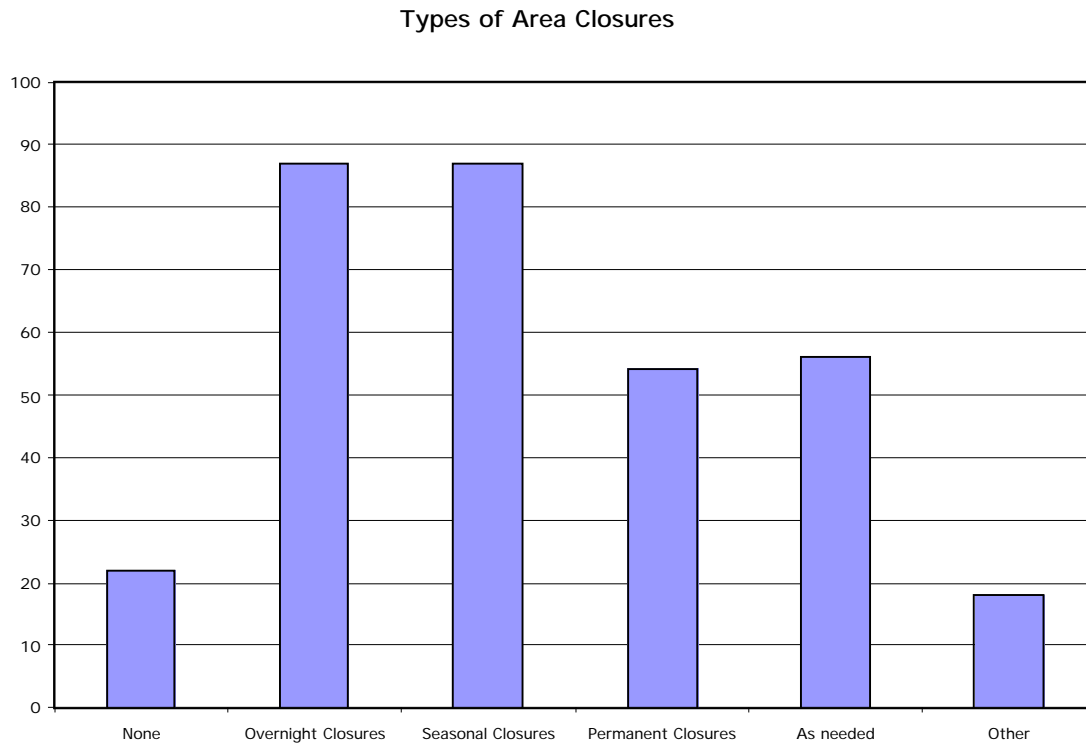


Figure 17. Types of Area Closures Employed by Respondents

The most common types of area closures employed by respondents are overnight and seasonal. Many respondents also employ area closures on an “as-needed” basis. Many of these respondents indicated that the reasons for “as-needed” closures were based on seasonal species-specific needs, so could have been grouped with seasonal closures (nineteen respondents total). Specifically, respondents indicated closures on an “as-needed” basis for bald eagle nesting sites, colonial nesting shorebirds, nesting animals in general, breeding bird colonies, heron rookeries, alligator nesting, wood duck nesting, and shellfish harvesting. Additional “as-needed” reasons for closures included flood conditions, drought conditions, storm damage, or general repair needs (21), high public use (3), public safety (2), specific management needs (2), and for research. Six respondents who marked “as-needed” did not specify a reason. Closures indicated under the “other” category included the limiting of access *type*, construction closures, closures of dune areas only, closure of banding areas, and closure of fields irrigated with sewage.

Respondents were asked to explain why they feel closing certain areas of their site has or has not been an effective management technique for avoiding or reducing the impacts of human activities on wildlife.

The following provides a summary of respondent comments and are grouped, to the degree possible, by closure type. General overall responses and additional specific responses are also summarized.

General Comments. The overwhelming majority of the respondents felt area closures have been an effective management technique. Several respondents, however, cited compliance issues as a challenge for effectiveness of area closures. Specifically, three respondents indicated that closures are effective only if enforced and maintained on a constant basis. Two respondents cited low compliance with closures at their site and one added that though law enforcement responses can be effective, they come with high costs and negative public relations. Another respondent indicated that due to many points of entry and limited staff, encroachment on a closed area could occur. Similarly one respondent indicated that closures are effective on inland sites, but not effective along the shoreline. One respondent indicated the importance of involving the public in area closings and openings in an effort to get public “buy in” and to increase compliance. Finally, one respondent cited the practice of not marking trails in an effort to decrease access without employing official area closures.

Several respondents indicated that area closures are driven by safety and maintenance needs not wildlife protection, though one respondent cited the indirect benefits for wildlife of closures for personal safety. Additionally, one respondent cited the safety benefits and visitor satisfaction from closures that separate uses.

Overnight Closures. The most common reason given for why overnight closures have been an effective management technique for avoiding or reducing the impacts of human activities on wildlife can be grouped under the general category of wildlife/habitat protection/recovery (26). More specific wildlife protection benefits mentioned included several references to protection of nesting sea turtles (5), waterfowl (3), nesting shorebirds (3), and nocturnal/crepuscular foraging animals (2). Also mentioned was protection of the Northeastern Beach Tiger Beetle, migratory nesting species, protection of bear feeding areas, and generally providing higher quality nesting and feeding habitat. Finally, two respondents mentioned better security as the reason why overnight closures have been effective.

Reasons indicated for possible ineffectiveness of overnight closures included lack of visitor compliance with closure (3). One respondent couldn’t speak to effectiveness due to lack of data, and one respondent stated no impact “either way” was noticed.

Seasonal Closures. Like overnight closures, the most common reason cited for effectiveness of seasonal closures can be grouped under the general category of wildlife/habitat protection/recovery (28). Specific wildlife protection benefits cited included protection for nesting birds (11), waterfowl (8), nesting turtles (2), and eagle nests (2). Additional comments included the provision of higher quality nesting and feeding habitat, protection of mouse burrows, alligator nests, shorebirds, waders, breeding harbor seals, Canada geese, Piping plover nesting and migratory nesting, as well as shellfish regeneration and intertidal species recovery. Two respondents mentioned the potential cost savings of seasonal closures when visitation is low.

One respondent indicated compliance issues as a potential reason why seasonal closures may not be effective, and one respondent cited lack of data available to evaluate effectiveness.

Permanent Closures. The majority (16) of the respondents who employ permanent closures at their sites indicated general wildlife/habitat protection/recovery as why the closures have been effective. Specific wildlife protection benefits cited by respondents included

protection for waterfowl (4) and waders (2), provision of higher quality nesting and feeding habitat (2), reduction of nest abandonment, protection for migratory nesting, increase of shellfish population, and protection for endangered plant species. One respondent indicated that upon permanently closing a two-mile trail, bald eagles have successfully bred every year where previously they failed to produce any young.

One respondent stated that the significance of no access in terms of effect on wildlife is highly debated.

Visitor Number Limitations. 105 respondents indicated they do limit the number of visitors on their site. 48 respondents do not limit the number of visitors, and 4 respondents did not answer.

The most frequently given reason for limiting the number of visitors was due to the carrying capacity of the habitat or the facility (41), followed by the desire to decrease impact on wildlife/habitat (20). Other reasons for limiting numbers of visitors included increasing visitor satisfaction (7), staff limitations or logistics (4), visitor safety (4), legislation or regulations (2), and to limit impacts to research (1).

Respondents were asked to explain why they feel that visitor limits have or have not been an effective management technique for avoiding or reducing the impacts of human activities on wildlife.

The vast majority of respondents indicated they felt visitor limits have been an effective management technique for avoiding or reducing impacts. The most frequently given reason for why limits have been effective was the reduction of impacts on wildlife and/or habitat (22), followed by reduction of impacts on habitat. Four respondents indicated increase in visitor satisfaction as to why limits have been effective. Other reasons for effectiveness included safety, regulation of harvest/overuse of resources, and provision for short term protection for wildlife. One respondent indicated that visitor limits are especially effective when combined with education. Two respondents mentioned the need to define levels of acceptable change, select indicators, and set carrying capacity.

Two respondents indicated that visitor limits have not been an effective management technique for avoiding or reducing impacts on wildlife. One respondent indicated that limits do enhance the visitor experience, however, and one respondent indicated that parking has no effect on wildlife in a day use area.

Five respondents indicated that they did not know if visitor limits have or have not been an effective management technique. Three respondents indicated a lack of data, and one respondent pointed to a lack of staff and funds for monitoring.

Visitor Activity Restrictions. 137 respondents restrict certain activities on their sites. 17 respondents do not restrict activities, and three respondents did not answer the question.

Respondents were asked to specify what activity types they restrict and why, and to explain why they feel that restricting certain activities has or has not been an effective management technique for avoiding or reducing recreational impacts on wildlife at their site.

Respondents' answers to what types of activities are restricted can be classified into eighteen general categories (Figure 18). The following provides a summary of respondent comments and are grouped, to the degree possible, by type of restricted activity. General overall responses and additional specific responses are also summarized.

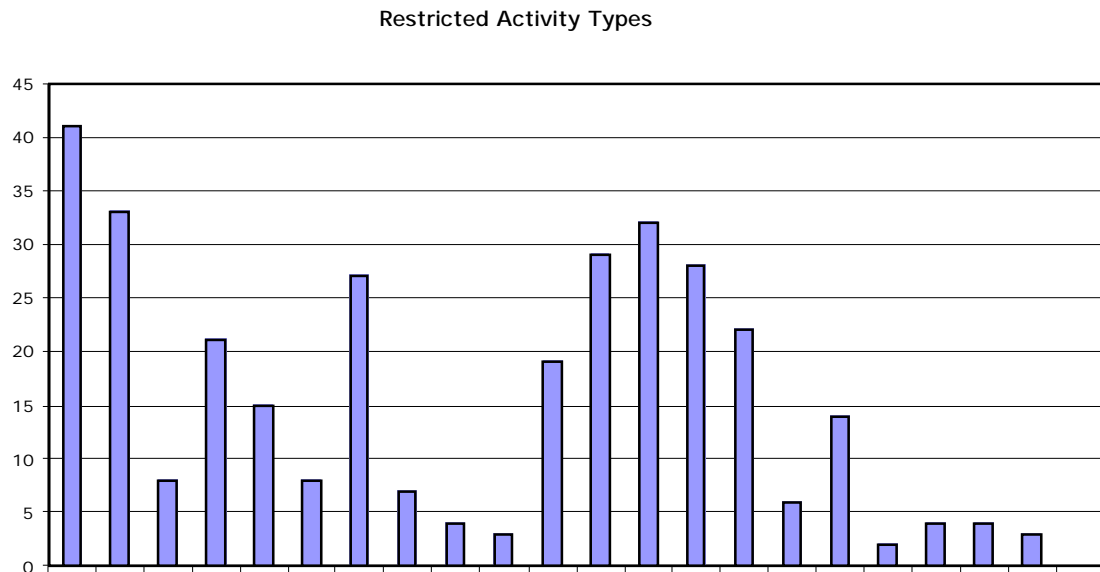


Figure 18. Types of User Activity Restrictions Employed by Respondents

General Comments. The vast majority of the respondents felt restrictions on activity types were an effective technique to reduce impact on wildlife, though two respondents in general comments indicated restrictions are only effective if enforced. One respondent indicated in a general comment that activity type restrictions had not been effective because most impacts came from permitted uses such as hiking and camping. Five respondents specifically said they did not know if activity type restrictions were effective due to lack of data, lack of enforcement, or because the restrictions were not specifically for wildlife.

Boat Restrictions. Thirty respondents employ some sort of boat restrictions including restrictions on type, size, speed, and accessible area. All respondents who employ restrictions on boats felt the restrictions were effective. The most frequently cited reason for boat restrictions was to prevent or reduce disturbance to wildlife, especially nesting shorebirds and waterfowl. Additional reasons for effectiveness indicated by respondents included; reduction of noise pollution, reduction of impacts from wakes, reduction of hydrocarbons in water, reduction of exotic invasive species (by restricting gas engines), reduction of propeller scarring of seagrass beds.

One respondent indicated insufficient staff to regulate restrictions as a potential challenge to effectiveness.

Jetskis. Although jetski restrictions could fall under the general heading of boat restrictions, they are discussed under a separate category due to the high volume of respondents who specifically mentioned jetski restrictions.

All respondents who imposed jetski restrictions at their sites felt the restrictions were effective in reducing disturbance to wildlife from noise, pollution, harassment, and habitat impacts. One respondent specifically noted that minimization of jetskis has encouraged birds to use the area for feeding.

Non-motorized Water-Oriented Uses. Restricted uses under this category include windsurfing and swimming. Respondents gave no specific comments on reasons for limitations. One respondent indicated that insufficient staff limited efforts to regulate windsurfing restrictions. No other specific comments on effectiveness were given.

Horses. Respondents felt limitation of horses was an effective technique because horses increase the environmental impact of trails, horses can cover much area and so increase access to outlying areas, and because horses directly disturb wildlife. One respondent indicated, however, that though horses on their site are restricted to trails, the riders do stray from the trails.

Hunting/Trapping/Fishing. The only specific comment related to hunting/fishing/trapping restrictions was that hunting restrictions are difficult to enforce.

Collecting. One respondent indicated that restrictions on collecting have helped educate the public about the resource. One respondent indicated that restrictions on collecting are difficult to enforce.

Pet Restrictions. Within the category of pet restrictions, eight respondents specifically mentioned restrictions on unleashed dogs.

Most respondents felt that pet restrictions were an effective technique to avoid or reduce impacts on wildlife because pet restrictions benefit sea turtle and shorebird nesting success, beach mice, waterfowl and shorebirds. One respondent indicated that pet restrictions have not been effective due to political pressure to allow fox hounds on the site, and one respondent mentioned the difficulty of enforcing leash restrictions.

Please note that pet restrictions are also discussed under restrictions on user behavior.

Kites/Model Planes. One respondent indicated that kites may resemble birds of prey.

Non-Wildlife Dependent Activities. National Wildlife Refuges by law only allow specified wildlife dependent activities. Respondents indicated that restricting non-wildlife dependent activities is an effective technique because: wildlife dependent activities have less impact, are less destructive and are less disturbing to wildlife; sanctuaries for wildlife are provided; restricting activities reduces the total number of visits and, therefore, minimizes adverse effects on wildlife, allows managers time to determine impacts and adjust accordingly, provides for greater visitor satisfaction, and the associated cost savings of restricting uses can be used to enhance management programs or wildlife oriented recreational opportunities.

ATVs/ORVs. The vast majority of the respondents felt restricting ATVs/ORVs was an effective management technique. The most common benefits of restrictions indicated by respondents were: protection of ground nests; reduced impact to vegetation and soil; reduced

wildlife mortality; protection of wildlife habitat; limitation of new areas opened up for predator travel; wetland protection from rutting, trail hardening, and channelization of water sheet flow; protection of dune habitat; decrease in noise pollution; decrease of human incursion into isolated habitat areas.

One respondent mentioned the difficulty of enforcing ATV/ORV restrictions.

Motorized Vehicles (including cars, motorbikes, snowmobiles). All the comments on restrictions of motorized vehicles felt the restrictions are an effective technique. Specific benefits of restrictions indicated by respondents include: protection of dune habitat; reduction of noise; reduction of erosion; reduction of wildlife mortality; protection of vegetation from severing, trampling, and compaction; limitation of overall access to site; reduction of impacts to shorebirds, beach mice, and seals.

Bicycles. The majority of respondents felt restrictions on bicycles were an effective technique. Specific benefits of bicycle restrictions indicated by respondents included: protection of ground nests, reduction of soil compaction and erosion, protection of vegetation, decrease in user conflicts, reduction of environmental impact of trails, limitation of overall access to site, reduction of wildlife disturbance.

One respondent indicated that since bicycles do not have a large negative impact on wildlife, restrictions on bicycle use is not an effective technique to reduce impacts.

Skateboarding/Skating/Sandboarding. One respondent indicated that rollerblades increase environmental impact of trails.

Active Organized Recreation. Activities under this category include frisbee, golf, ballplaying, and horseshoes. No specific comments were provided for this category.

Camping/Campfires. One respondent indicated that limiting camping to designated areas reduces damage to natural resources.

Jogging/Walking. One respondent indicated that night walking on beach impacts sea turtles. One respondent indicated jogging is more disturbing to wildlife and detracts from wildlife oriented recreation.

All but Limited Passive Use. One respondent indicated that restricting uses to all but limited passive use allows area to support unique ecological features. Respondents also indicated that foot traffic only on trails increases visitor satisfaction, eliminates noise disturbance of wildlife, reduces trail erosion, and limits costs associated with maintenance.

Miscellaneous. This category includes all other restricted activities indicated by respondents including metal detectors, sunbathing, chainsaws, generators, and dumping.

Restrictions on User Behavior. 137 respondents restrict user behavior at their sites. 13 respondents do not restrict user behavior and seven respondents did not answer.

Respondents were asked to specify which user behaviors are restricted, the reason for the restrictions, and why they feel user behavior restrictions have or have not been an effective management technique for avoiding or reducing recreational impacts at their site.

Types of restrictions on user behavior can be grouped into sixteen general categories (Figure 19). The following provides a summary of respondent comments and are grouped, to the degree possible, by type of user behavior restriction. General overall responses and additional specific responses are also summarized.

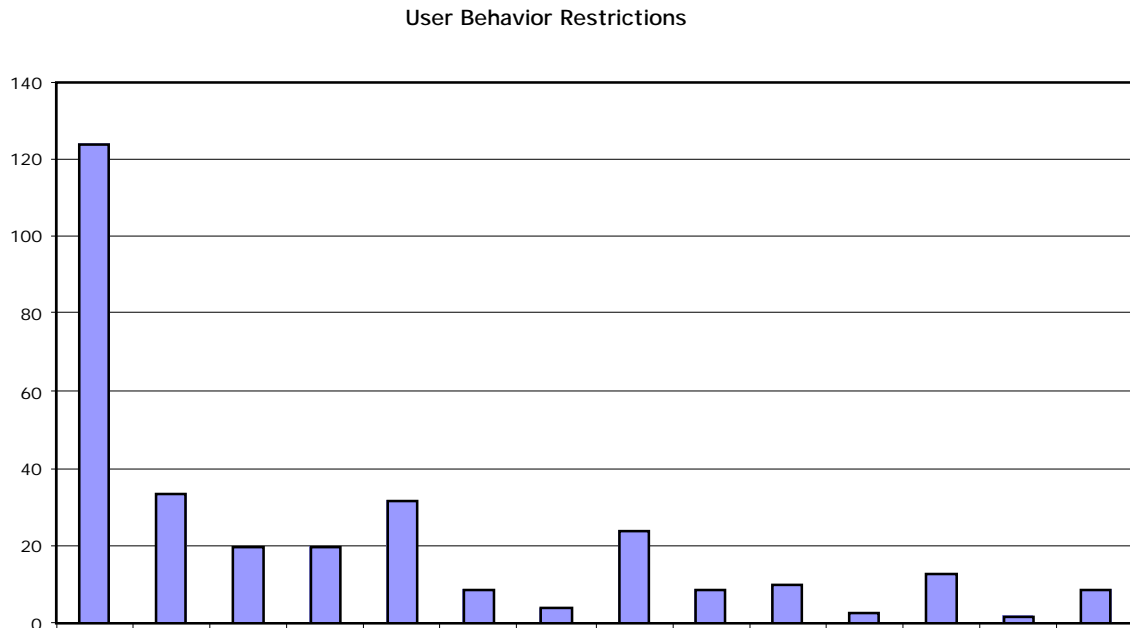


Figure 19. Types of Behavior Restrictions Employed by Respondents

General Comments. The majority of the respondents felt that restricting certain activities was an effective management technique for avoiding or reducing recreational impacts on wildlife. In general, respondents indicated that activity restrictions protect resources overall. More specifically, respondents indicated that restricting type of use restricts the overall number of potential users, keeps public use focused in developed areas, provides continuity for visitors and, if supported by the public, new users will abide by restrictions due to “peer pressure.” One respondent indicated that by comparing their site to similar sites, they were able to prevent impacts by imposing proactive restrictions before a problem occurs.

Though only four respondents specifically stated that activity type restrictions have not been an effective technique, several more respondents indicated specific challenges to the success of activity type restrictions. Several respondents indicated the need for enforcement of the restrictions and for education of visitors. One respondent indicated that law enforcement staff (not park staff) lack sensitivity to wildlife needs. One respondent mentioned the specific problem of having a site that has high rate of new visitors, with a high tourist attendance and high rate of

turnover in the community. In this case, efforts to “train” new users must be ongoing and enforcement must be continuous, which is problematic. One respondent mentioned the difficulty of enforcement without being invasive.

One respondent indicated that activity type restrictions control impacts, but do not eliminate them. Finally, one respondent indicated that behavior restrictions are not needed with proper trail siting and design.

Six respondents did not know if restricting activity types was an effective technique. Several indicated lack of data.

Pet Restrictions. The most commonly restricted activity type among respondents falls under the heading of pet restrictions. 24 respondents had general pet restrictions (e.g., no pets), 9 respondents required dogs to be under voice control, 9 respondents specifically allow dogs on the beach, 2 respondents required visitors to clean up after dogs, and 80 respondents required dogs/pets to be on leashes (sometimes of various lengths and in various specific areas of the sites).

The most common reason indicated by respondents for pet restrictions was for the protection of wildlife from harassment. Many respondents indicated benefits to birds from restrictions, specifically shorebirds, waterfowl, overwintering geese, nesting terns, bald eagles, and peregrine falcons. Other wildlife mentioned specifically as benefiting from pet restrictions were sea turtles and sea turtle nests, marine mammals, and terrestrial species. One respondent indicated that pet restrictions were especially effective in avoiding or limiting wildlife impact when wildlife is confined to a small, diminishing habitat. The safety and visitor satisfaction of other visitors was also mentioned frequently as a reason for pet restrictions. One respondent mentioned the secondary benefit of leash laws is they likely encourage owners to pick up waste as well.

Several respondents indicated that the effectiveness of pet restrictions was dependent upon enforcement. One respondent stated that leash laws are commonly ignored, but that compliance increases with visitor education about the benefits of leash laws.

Site Access Restrictions. One respondent indicated that the extremely limited access at their site has increased species productivity and population levels and has allowed previously extirpated species to return to site. One respondent indicated that though access restrictions keep public to a defined area and thus leave other areas for wildlife only, the areas are so small and fragmented that this strategy only works to a small degree.

Please note that access restrictions are also discussed under area closures.

Removal/Collecting. One respondent indicated that though collecting restrictions were put in place to conserve an educational resource (tidepools) birds have also benefited from preservation of a food source.

Feeding Wildlife. One respondent indicated that feeding restrictions keep most species non-aggressive.

There were no additional comments provided for the remaining categories under user behavior restrictions.

Enforcement. Respondents were asked to explain how, if at all, they enforce public use regulations at their site, and why they feel that their public-use enforcement mechanisms have or have not been effective at avoiding or reducing the effects of human activities on wildlife.

Types of enforcement mechanisms indicated can be grouped into 11 general categories (Figure 20). The following provides a summary of respondent comments and are grouped, to the degree possible, by enforcement type. General overall responses and additional specific responses are also summarized.

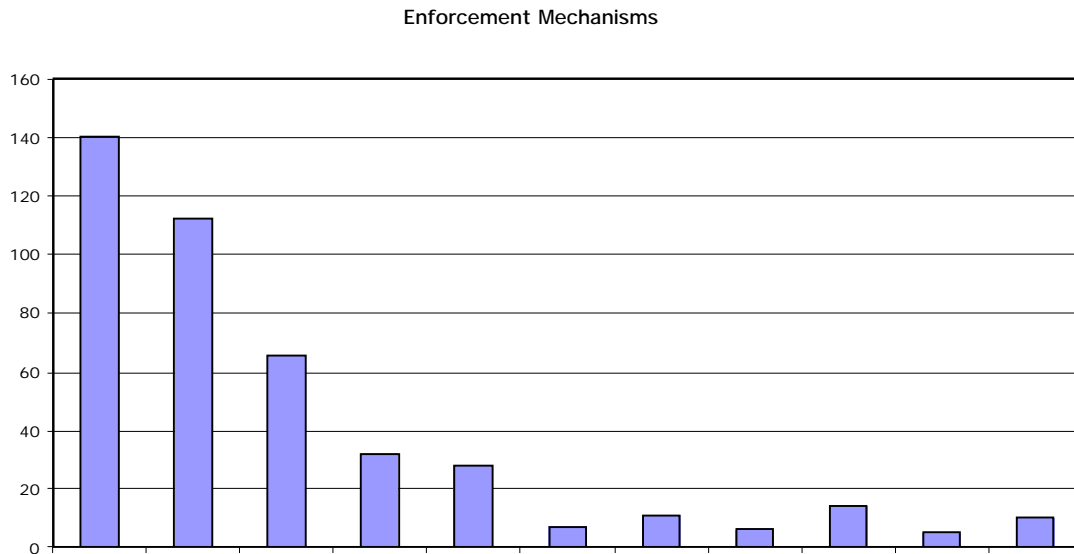


Figure 20. Types of Public Use Enforcement Mechanisms Employed by Respondents

General Comments. The majority of respondents indicated that their public-use enforcement mechanisms have been effective at avoiding or reducing the effects of human activities on wildlife. Comments included the need for various degrees of enforcement, including the comment that simply having some sort of staff presence increases effectiveness (though another respondent indicated that enforcement is only effective if staff witnesses violations), and that the public generally understands and respects environmental messages and conservation ethics and wants to do the “right thing” and that restrictions are more effective with public involvement. However, one respondent also indicated the importance of enforcement to keep public from “taking advantage” of the site and another respondent indicated noticing a resurgence of unacceptable behavior appearing during periods of lax enforcement. One respondent indicated the importance of providing alternative sites for other activities in addition to enforcing

restrictions. Several respondents indicated that enforcement mechanisms assist in educating the public. One respondent indicated that success of enforcement mechanisms was due to docents and self-policing by the public. Many respondents indicated that limited staff and funds affect success of enforcement mechanisms.

Thirteen respondents specifically indicated that enforcement mechanisms had not been effective at reducing or avoiding impacts to wildlife. Several of those respondents indicated lack of staff as a primary reason for reduction of success. Respondents specifically mentioned the difficulty of patrolling outlying areas and the lack of formal entrance and exit areas to monitor area closures. One respondent also indicated that relying on volunteers to assist with enforcement is not generally successful, as most volunteers would rather help with field research, rather than enforcement. Two respondent indicated that enforcement mechanisms are geared towards managing recreational use, not wildlife. Another respondent indicated that public use restrictions were much more effective than enforcement mechanisms in avoiding or reducing impacts to wildlife. One respondent mentioned that being part of a national system was beneficial in that many visitors are familiar with common regulations. Finally, one respondent indicated that there will always be a small percentage of people who do not follow guidelines who will therefore have an impact on wildlife.

Ten respondents did not know if enforcement mechanisms were effective. Many of those respondents required more data.

Ranger Patrols/Law Enforcement. Several respondents indicated that ranger patrols and/or law enforcement were effective enforcement mechanisms because personal contact creates an opportunity to answer questions and educate the public to reduce future violations, especially effective in areas with high repeat usage. One respondent indicated that the public recognized and appreciated the patrols. Several respondents indicated that ranger patrols were effective but that it was impossible to be “everywhere at once.” One respondent indicated that seven days a week patrolling has been very effective, though another indicated that random, once a week patrols should suffice. One respondent indicated the success of aerial patrols because they are generally unseen and users know they may be under surveillance. Several respondents mentioned the importance of combining enforcement mechanisms with other techniques such as interpretive programs and signage as being particularly effective. One respondent indicated that law enforcement with strong court support is essential to avoid or reduce human impacts on wildlife. One respondent indicated that similar areas without enforcement mechanisms show escalating law enforcement problems. Two respondents cited ranger patrol/law enforcement as being particularly effective relative to hunting, poaching, and fishing restrictions.

Lack of staff/funds and too large an area to adequately patrol were the most commonly cited challenges for ranger patrol and/or law enforcement success.

Signage. Several respondents indicated that signage is effective when combined with patrolling/staff presence. Two respondents indicated that signage was effective at keeping users within certain areas. Respondents indicated that signage must be properly worded and visible, and colorful and descriptive. One respondent indicated that signage is somewhat effective, but that noncompliance can not be stopped, only deterred.

Printed Material. One respondent indicated that printed material does not work as an enforcement mechanism because the public feels they have certain rights to the site and they “do as they please.”

Education. Two respondents indicated that enforcement through education is their most effective tool, though one of these indicated in addition that the education must be ongoing due to new visitors at site. Two respondents indicated a combination of education/interpretive programs with staff interaction/ranger patrols is the most effective enforcement mechanism.

Visitor Center. One respondent indicated the visitor center was a successful enforcement mechanism because all visitors must first stop in visitor center so everyone hears about the site's regulations.

Education and Outreach. Respondents were asked to specify what types, if any, of education and outreach programs they offer (Figure 21).

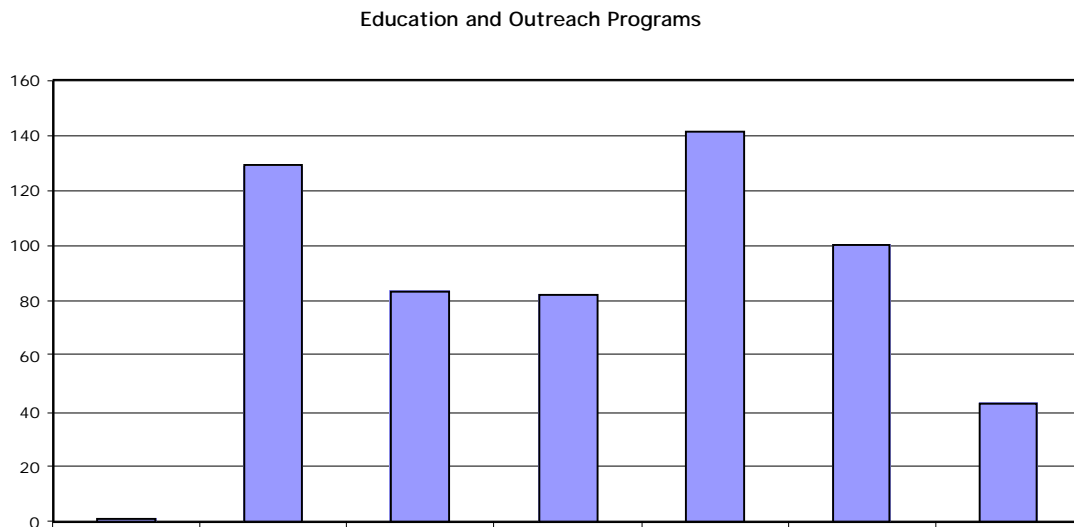


Figure 21. Education and Outreach Programs Employed by Respondents

The most common types of education and outreach programs include the use of written materials and self guided tours/interpretive signs.

Respondents were asked to explain why they feel that education and outreach programs have or have not been an effective management techniques for avoiding or reducing impacts from human activity on wildlife at their site.

The following provides a summary of respondent comments.

General Comments. The majority of respondents felt education and outreach programs have been an effective management techniques. Several respondents indicated educational efforts have resulted in a more educated, responsible and appreciative visitor thereby reducing recreational impacts on wildlife. One respondent indicated that educational efforts result in both immediate and long term behavior changes. Respondents also commented on the benefit of education in fostering public support for the site, and a few respondents also added that an educated user may educate other users. It was noted by several respondents that education works very well where a high portion of the visiting public is local and that working with the local community and local schools is very effective. Several respondents indicated the importance and benefit of educating children, one respondent added that education of children can result in changes in parent behavior, and one respondent indicated many adults volunteer at the site after attending educational programs. One respondent indicated the connection between education, which improved local public understanding of the site, and the resulting passage of a local ordinance to protect the site. One respondent indicated that as a result of public education efforts, local landowners participated in conservation easements. Finally one respondent indicated that personal contact via docents/naturalists is a very effective technique, and another respondent indicated the value of training all staff, including volunteers, to provide consistent responses to visitor questions and actions.

Several respondents did indicate that education and outreach programs have not been an effective management technique. Many of those respondents indicated lack of staff and funds as the reason the programs were not effective. Several respondents indicated that education without enforcement was not enough, and that more staff was needed to accomplish both strategies. One respondent indicated that successful outreach takes commitment and consistency to be done correctly. Several respondents mentioned lack of participation or lack of interest from the public in educational efforts, that many casual park visitors are not interested in participating in passive educational programs, including reading interpretive signs and printed materials. However, one of the respondents did indicate that a well-paid, well-trained ranger/interpreter was a very successful tool in preventing impacts. As mentioned above, several respondents indicated a lack of success due to seasonal visitation from a broad area, the small number of visitors reached and high turnover. One respondent mentioned potentially conflicting messages from other county, state or federal programs and one respondent felt educational programs were basically unnecessary as the visitor learns from other sources such as school and television.

Five respondents indicated that they did not know if education and outreach programs were successful.

3. Wildlife Management

Respondents were asked what types, if any of wildlife management and monitoring techniques do they employ at their sites specifically to avoid or reduce impacts from human activities on wildlife (Figure 22). Wildlife monitoring was the most frequently identified technique, followed by habitat modification, restoration or enhancement.

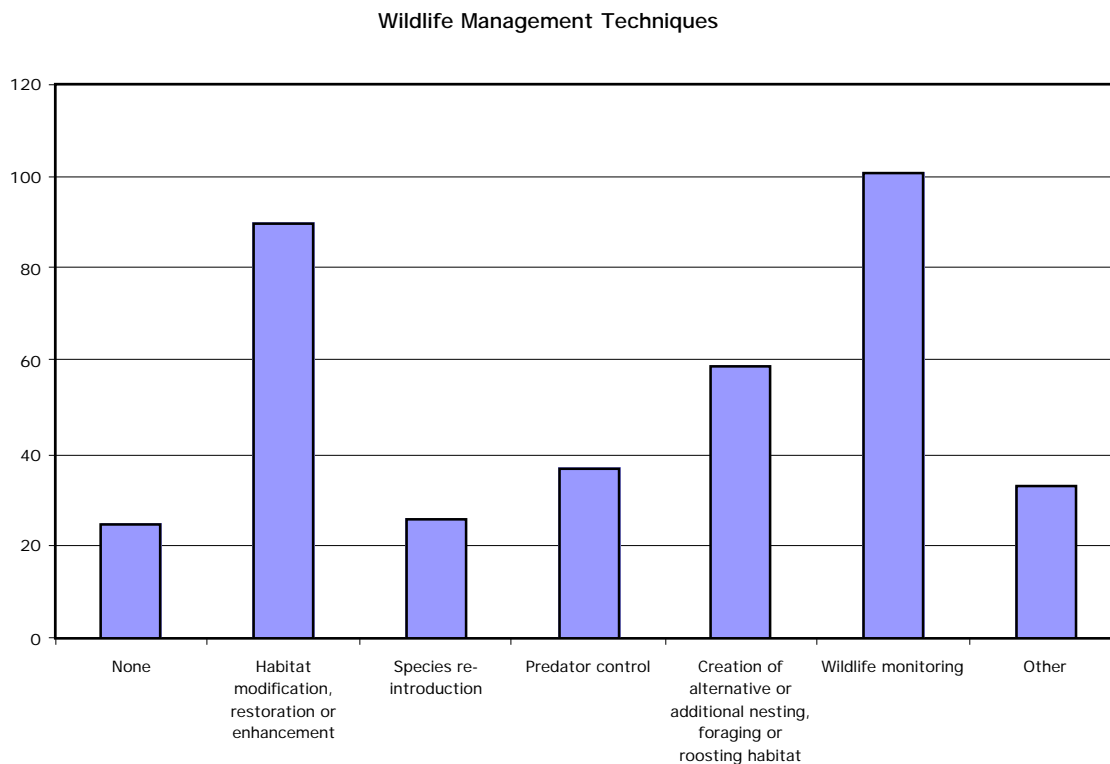


Figure 22. Wildlife Management and Monitoring Techniques to Avoid or Reduce Impacts From Human Activities on Wildlife Employed by Respondents

Respondents were asked to explain whether they feel that the wildlife management and monitoring techniques employed at their site have or have not been effective in avoiding or reducing impacts from human activities on wildlife.

The majority of respondents felt wildlife management and monitoring techniques have been effective. The following provides a summary of specific comments on wildlife management.

Wildlife Monitoring. Most respondents who commented specifically on monitoring indicated that wildlife monitoring has been effective because monitoring establishes a baseline and enables staff to track efforts to protect wildlife, and assists staff in making decisions to implement any management changes. Respondents also indicated that monitoring programs increase public involvement and sense of stewardship and can map critical habitat for specific species which can then be avoided by visitors.

Habitat Modification, Restoration, Enhancement. Several respondents indicated that habitat modifications allowed provision of high quality public access that maintains reasonable wildlife use and keeps public out of critical habitat areas. Respondents also indicated that habitat restoration and enhancement can correct prior human alterations and increase wildlife numbers and biodiversity. One respondent indicated that by modifying habitat and providing additional nesting areas, they have had little or no impact on wildlife at their site.

Predator Control. Several respondents indicated that control of predators has had a positive effect on wildlife, though one respondent indicated that predator control was the least effective technique due to the highly urban environment surrounding the site.

Creation of Alternative or Additional Nesting, Foraging, or Roosting Habitat. Two respondents indicated that creation of alternative nesting habitat has been successful for osprey and wood ducks. However, one respondent indicated that osprey platforms were not effective, probably because the area is too heavily used by the public.